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**From:** G D Beckett [g.d.beckett@aquiver.com]  
**Sent:** 8/31/2018 4:26:31 PM  
**To:** Grange, Gabrielle Fenix [gabrielle.grange@doh.hawaii.gov]; Matt Tonkin [matt@sspa.com]; TU, LYNDSEY [Tu.Lyndsey@epa.gov]; Whittier, Robert [Robert.Whittier@doh.hawaii.gov]; dthomas@soest.hawaii.edu; g.d.beckett@aquiver.com  
**Subject:** Re: Added to DropBox

Many thanks Don! What I see, I think, is that wells within the potential "halo" of contaminant impacts are all generally warmer than "clean" wells. RHMW04 is potentially within the halo, but is at the upper reaches and would be expected to be recharged with cooler water from upstream (and it is relatively oxygenated), and the low concentration history there doesn't suggest nearby NAPL. RHMW02, 03, and 05 are substantially elevated indicating biodeg in their vicinity. Don't want to read too much into this alone, but it seems to me to be consistent with the other lines of evidence we have been discussing relative to potential distal transport and the presence of some LNAPL source (residual or otherwise) in the aquifer zone.

Best regards.

**G.D. Beckett, RG, CHg**

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>>> Donald Thomas<dthomas@soest.hawaii.edu> 8/30/2018 10:16 PM >>>

Hi All,

I wanted to have a look at the temperature versus depth variations in the synoptic data and generated the attached plot. I don't know yet whether it is telling us anything useful, but it's pretty clear that there is a strong temperature gradient in RHMW05 (for reasons that are not as yet obvious) generating a pretty large spread in the temperature data for the variation in the water levels. There is a weaker one in RHMW02 - most unfortunately, the sensor in RHMW01 was placed much further below the water table (I had to subtract 28 feet from the actual depth to plot it on the same scale) and so it completely misses the gradient at the top of the water table - but would have shown "something" about the wells along the linear trend of RHMW01-02-03 that might have been interesting. RHMW03 is interesting for how little gradient there is there - suggesting a well-mixed water table at its placement depth.

Not earth-shattering results, but worth pondering a little bit...

Don

On 8/30/2018 3:54 PM, Whittier, Robert wrote:

Hi All,

I took the liberty of adding a couple of things to the drop box.

The first is a Hickam POL report that details the environmental investigation into two large USTs sites that are now decommissioned. Since there are similarities to Red Hill these site investigations may be helpful in understanding Red Hill. I book marked the major figures and tables (the report pre-dated imbedding TOC in pdfs).

The Waikakalaua Fuel Storage Facility had 9 large USTs and two disposal basins. It is located on the Schofield Plateau at Wheeler Army Airfield overlying the basal aquifer (as opposed to the Schofield High Water Body). The primary areas of contamination were sludge disposal areas and two open bottom disposal basins. However, the USTs like all USTs did leak. TCE and TCP shows up in a lot of the wells, but is from off-site sources.

The Kipapa Fuel Storage Facility is a site with 4-1000' long USTs installed in the wall of Kipapa Gulch. The tanks have leaked, but also there was a large release in the '70s, sludge disposal. ST01MW009 may be interesting in showing the distribution of contamination in the basalt above the water table. Kipapa Stream runs through the site and there is perched water similar to the situation at Red Hill.

Valve Pit 17 was a fuel transfer station in Kipapa Gulch. This was the site of large releases. Like KFSA is near Kipapa Stream overlying perched water.

The second thing I added was a compilation of the inorganic natural attenuation and water quality parameters, and depth to water for Red Hill. Added some basic statistics (min, avg., max, std.dev.) and summary graphs. There are three computed fields:

1. NO3 as N Comp - where I computed the NO3 as N from what appears to NO3 as NO3 concentrations.
2. SO4:Cl ratio to evaluate any SO4 enrichment or depletion. The seawater SO4:Cl ratio is 0.14 and in precipitation runs from about 0.14 to 0.19.
3. Cl/Spec.Cond- which is a check for field measurement errors as would be indicated by a shift in the Cl:specific Conductivity ratio.

Added bar graphs of major parameters with min, avg, & max grouped by zones within the monitoring network

1. The wells to the southeast
2. the tunnel wells
3. The wells to the northwest, and
4. the wells in Halawa Valley

Finally added a map of the nitrate distribution throughout the State of Hawaii. The high nitrate wells in east Maui are like from the 7,000+ cesspools upgradient of those wells. The intent is to show how unusual the elevated nitrate concentrations are in the northwest wells.

Hope you find these informative and useful,

Bob W.

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